In the Specification:

Please amend the paragraph beginning on page 1, line 13 as follows:

In recent years, there ~~is~~ has been an increasing need ~~of~~ for high-density recording in magnetic storage devices ~~known~~ such as hard disk drives. In such hard disk drives for high-density recording, it is necessary to reduce the magnetic spacing, which is a space formed between a magnetic head provided in the magnetic disk drives and the surface of a magnetic disk serving as a recording medium in the main body of the hard disk drives, as much as possible. In other words, the gap between the magnetic head and the magnetic disk surface, scanned by the magnetic head, should be as small as possible.

Please amend the paragraph beginning on page 1, line 37 as follows:

The magnetic disk drive 100 described above generally operates in accordance with the so-called contact-start-stop (CSS) mode. With the CSS mode, a lift surface 120a of the magnetic head 120 contacts and slides over the surface of the magnetic disk 110 at the start or stop phase of rotation of the magnetic disk 110. ~~So t~~The magnetic disk ~~drive~~ 110 has a CSS area within its surface. The magnetic head 120 contacts the CSS area when the magnetic disk 110 starts and stops rotating. On the other hand, the magnetic head 120 can float in the air with airflow caused by the rotation of the magnetic disk 110 when the magnetic disk drive 100 operates.

Please amend the paragraph beginning on page 2, line 24 as follows:

~~As described above, t~~The magnetic disk 110 has ~~the~~ a lubrication layer 119, which is formed by lubricant, on the protection layer 117. As the lubricant layer 119 has influence on the friction and the abrasion properties of the magnetic disk 110, it is important to keep the lubrication layer 119 ~~on~~ in good conditions for maintaining the reliability of the magnetic disk drive 100.

Please amend the paragraph beginning on page 3, line 3 as follows:

However, the inside of the magnetic disk drive 100 ~~becomes~~ reaches a high temperature. Furthermore, the magnetic disk 110 rotates at high speed in the drive 100. Even under the most benign ambient conditions, the interior of the disk drive 100 is a high-temperature environment due to the high rate of rotation of the disk 110 relative to the head 120. Increasing the rate of rotation of the disk 110 increases the centrifugal force that acts on any element of the lubrication layer 119; increasing the temperature of the disk 110 also increases the mobility of the elements of the lubrication layer 119. Elements of the lubrication layer 119 thus tend to move towards the circumference of the disk 110 over time, where they are more likely to be spun off the disk 110, so that the lubrication layer 119 tends to become thinner as the service time of the disk increases. A thinning lubrication layer 119 loses the capability of fulfilling its several roles. In order to prevent the lubrication layer 119 from losing the capability, the lubrication layer 119 should be formed by lubricant having strong adsorptive property to the surface (the protection layer 117) of the magnetic disk 110.

Please amend the paragraph beginning on page 4, line 5 as follows:

~~In order~~ It is important to maintain the original ~~thickens~~ thickness of the lubrication layer 119 as much as possible, even for the magnetic disk 110 that is used for a long period of time. Thinning of the lubrication layer 119 is associated with loss of the mobile sub-layer 119b. Minimizing the thinning of the lubrication layer is accomplished by maximizing the "bonding ratio" of the lubrication layer, which is the ratio of the bonding sub-layer 119a to the mobile sub-layer 119b.

Please amend the paragraph beginning on page 4, line 14 as follows:

Many prior arts disks attempted to increase the thickness of the bonding sub-layer 119a. ~~By~~ In the prior arts, a lubricant is applied to the protection layer 117 of the magnetic disk 110, and ~~a~~ ultraviolet rays curing treatment or heating treatment is implemented on the lubrication layer 119 (lubricant) for increasing the ratio of the bonding sub-layer 119a (the bonding ratio).

Please amend the paragraph beginning on page 4, line 33 as follows:

The above objects are accomplished by a method of manufacturing a magnetic recording medium including steps of: a) laminating an underlayer, a magnetic layer for recording, and a protection layer of amorphous carbon on a substrate of the magnetic recording medium in turn, and b) repeating a process to the protection layer of amorphous carbon comprising an application process of applying a lubricant, a subsequent ultraviolet

rays treatment process, and a subsequent washing process for removing the lubricant which is not connected to the protection layer of amorphous carbon plural times~~, as claim 1 describes~~.

Please amend the paragraph beginning on page 5, line 9 as follows:

~~As claim 1 describes, t~~The process to the protection layer of amorphous carbon comprising the application process of applying the lubricant, the subsequent ultraviolet rays treatment process, and the subsequent washing process for removing the lubricant which is not connected to the protection layer of amorphous carbon is repeated plural times. Thus, it is possible to reduce the ratio of the mobile sub-layer and increase the ratio of the bonding sub-layer by repeating plural times one set of the above three ~~process~~processes.

Please amend the paragraph beginning on page 5, line 20 as follows:

That is, the combination power between a surface of the protection layer of amorphous carbon and the lubricant applied on the protection layer of amorphous carbon will be ~~strengthen~~strengthened. On the other hand, the bonding sub-layer whose combination power with the protection layer of amorphous carbon is lower will be ~~removing~~ removed by the subsequent wash process. Under the above state, it is easy to combine the lubricant with the surface of the protection layer of amorphous carbon because the lubricant is applied again. It is possible to increase the bonding ratio by repeating the process.

Please amend the paragraph beginning on page 5, line 32 as follows:

It is possible to either keep respective conditions for the above respective processes the same and repeat the process or modify a condition. For instance, an irradiation time in the ultraviolet rays (UV) treatment process can be modified based on a forming state of the bonding sub-layer.

Please amend the paragraph beginning on page 6, line 13 as follows:

~~As claim 2 describes, i~~It is preferred that the lubricant in the method ~~as claimed in claim 1~~ is a compound of the perfluoro-polyether with an end-group including piperonyl or hydroxyl group. The bonding ratio~~n~~ can be ~~increase~~ increased precisely by applying the lubricant, which is a compound of the perfluoro-polyether with an end-group including piperonyl or hydroxyl group and implementing ultraviolet rays (UV) treatment process as a process to strengthen the combination with the protection layer of amorphous carbon.

Please amend the paragraph beginning on page 6, line 34 as follows:

The above objects are also accomplished by a method of manufacturing a magnetic recording medium including the steps of: a) laminating an underlayer, a magnetic layer for recording, and a protection layer of amorphous carbon on a substrate of the magnetic recording medium in turn, and b) repeating a process to the protection layer of amorphous carbon comprising an application process of applying a lubricant, an subsequent heat treatment process, and a subsequent washing process for removing the lubricant which is not connected to the protection layer of amorphous carbon plural times~~, as claim 3 describes~~.

Please amend the paragraph beginning on page 7, line 10 as follows:

B13

It is possible to either keep respective conditions for the above respective processes the same and repeat the process or modify a condition. For instance, a temperature of heating in the heat treatment process can be modified based on a forming state of the bonding sub-layer.

Please amend the paragraph beginning on page 7, line 16 as follows:

B14

~~As claim 4 describes, i~~It is preferred that the lubricant in the above-described method ~~as claimed in claim 3~~ is a compound of the perfluoro-polyether with an end-group including hydroxyl group.

Please amend the paragraph beginning on page 7, line 20 as follows:

B15

The bonding ratio~~n~~ can be increased by applying the lubricant which is a compound of the perfluoro-polyether with an end-group including hydroxyl group and implementing the heat treatment process as a process to strengthen the combination with the protection layer of amorphous carbon.

Please amend the paragraph beginning on page 7, line 26 as follows:

B16

Furthermore, the above objects are also accomplished by a method of manufacturing a magnetic recording medium including the steps of: a) laminating an underlayer, a magnetic layer for recording, and a protection layer of amorphous carbon on a substrate of the magnetic recording medium in turn, and b) repeating a process to the

protection layer of amorphous carbon comprising an application process of applying a lubricant, and a subsequent ultraviolet rays treatment process plural times~~, as claim 5 describes~~.

Please amend the paragraph beginning on page 7, line 37 as follows:

~~As claim 6 describes, i~~It is preferred that the lubricant in the method ~~as claimed in claim 5~~ is a compound of the perfluoro-polyether with an end-group including piperonyl or hydroxyl group.

Please amend the paragraph beginning on page 8, line 4 as follows:

Furthermore, the above objects ~~is~~ are also accomplished by a method of manufacturing a magnetic recording medium including the steps of: a) laminating an underlayer, a magnetic layer for recording, and a protection layer of amorphous carbon on a substrate of the magnetic recording medium in turn, and b) repeating a process to ~~said~~ the protection layer of amorphous carbon comprising an application process of applying a lubricant, and a subsequent heat treatment process plural times~~, as claim 7 describes~~.

Please amend the paragraph beginning on page 8, line 15 as follows:

~~As claim 8 describes, i~~It is preferred that the lubricant in the method ~~as claimed in claim 7~~ is a compound of the perfluoro-polyether with an end-group including hydroxyl group.

Please amend the paragraph beginning on page 8, line 19 as follows:

~~The o~~Other objects in the present invention are to provide a magnetic recording medium having a lubricant layer comprising a bonding sub-layer on a surface of the magnetic recording medium and manufactured by a process including the steps of a) laminating an underlayer, a magnetic layer for recording, and a protection layer of amorphous carbon on a substrate of ~~said~~ the magnetic recording medium in turn, and, b) repeating plural times a process to the protection layer of amorphous carbon comprising an application process of applying a lubricant which is a compound of the perfluoro-polyether with an end-group including piperonyl or hydroxyl group, and a subsequent ultraviolet rays treatment process, or b) repeating plural times a progress to the protection layer of amorphous carbon comprising an application process of applying a lubricant which is a compound of the perfluoro-polyether with an end-group including piperonyl or hydroxyl group, a subsequent ultraviolet rays treatment process, and a further subsequent washing process for removing ~~said~~ the lubricant which is not connected to the protection layer of amorphous carbon~~, as claim 9 describes~~.

Please amend the paragraph beginning on page 9, line 6 as follows:

~~The~~ Still other objects in the present invention are to provide a magnetic recording medium having a lubricant layer including a bonding sub-layer on a surface of ~~said~~ the magnetic recording medium and manufactured by a process including the steps of a) laminating an underlayer, a magnetic layer for recording, and a protection layer of amorphous carbon on a substrate of the magnetic recording medium in turn, and, b) repeating plural

times a process to the protection layer of amorphous carbon comprising an application process of applying a lubricant which is a compound of the perfluoro-polyether with an end-group including hydroxyl group, and a subsequent heat treatment process, or b) repeating plural times a ~~progress~~ process to the protection layer of amorphous carbon comprising an application process of applying a lubricant which is a compound of the perfluoro-polyether with an end-group including hydroxyl group, a heat treatment process, and a further subsequent washing process for removing the lubricant which is not connected to ~~said~~ the protection layer of amorphous carbon~~, as claim 10 describes~~.

Please amend the paragraph beginning on page 11, line 5 as follows:

DETAILED DESCRIPTION OF THE ~~PREFERED~~ PREFERRED EMBODIMENTS

Please amend the paragraph beginning on page 11, line 21 as follows:

In the first embodiment of the present invention, a magnetic recording medium 1 manufactured by the prior art is prepared in advance. The magnetic recording medium 1 has a multilayered structure including a substrate, an underlayer formed on the substrate, and a magnetic layer formed on the underlayer. A protection layer of amorphous carbon is provided on the magnetic layer. The above-mentioned multilayered structure is the same as the prior arts shown in Fig. 1.

Please amend the paragraph beginning on page 12, line 27 as follows:

B24

In the ultraviolet rays (UV) treatment process (II), the UV wavelength of about 200nm and under is irradiated to the lubrication layer 2, and the duration may be set to roughly 60 seconds. It is possible to combine two or more kinds of ultraviolet rays, whose wavelengths are about 254nm and 185nm for instance.

Please amend the paragraph beginning on page 12, line 34 as follows:

B25

In Fig. 2, A, shown in the light side of the container 40 roughly schematically shows a construction of the lubrication layer 2 on the magnetic recording medium 1. Thus, there are a lot of mobile sub-layers 22 whose combination power is weak, as well as the bonding sub-layer 21 strongly ~~combing~~ combining with the protection layer of amorphous carbon in the lubrication layer 2 formed on the magnetic recording medium 1, after the application process of applying the lubricant 4 but before the ultraviolet rays (UV) treatment process. It is possible to change from the mobile sub-layers to the bonding sub-layer by implementing the ultraviolet rays (UV) treatment process to the lubrication layer 2. However, the mobile sub-layer is still contained in the lubrication layer after an ultraviolet rays (UV) treatment process.

Please amend the paragraph beginning on page 13, line 28 as follows:

B26

The fluorocarbon solvent ~~which~~ that is the same ~~one~~ as for diluting the above lubricant can be used as the solvent 6 for washing in this embodiment. The useful fluorocarbon solvent may not be limited, and other solvent is available as long as it can

remove the mobile sub-layer 22 from the surface of the magnetic recording medium 1. The wash process (III) is implemented for 30 seconds as a dipped time and by pulling the magnetic recording medium 1 from the bath at 2.3 mm per second for instance.

Please amend the paragraph beginning on page 14, line 1 as follows:

Furthermore, it can be accelerated to remove the mobile sub-layer 22 from the surface of the magnetic recording medium 1 if the temperature of solvent 6 for washing is roughly less than the boiling point (at about 25 centigrade in case of ~~said~~ FLORINATE FC-77), and if the magnetic recording medium 1 is washed by an ultrasonic generator in the wash process (III).

Please amend the paragraph beginning on page 15, line 6 as follows:

In Fig. 3, a white circle shows a case in which the application process and the ultraviolet rays (UV) treatment process are implemented one time according to prior arts. The width of the lubricant layer in this case is about 1.25 nm.

Please amend the paragraph beginning on page 15, line 11 as follows:

The respective black circles show widths according to the present invention. That is, they show respective cases of that one set process of the application process of applying the lubricant (I), the ultraviolet rays (UV) treatment process (II), and the washing process (III), ~~is~~ repeated 2-6 times. The respective black circles clearly show that the more

B29 the number of repeating the one set process increases, the more ~~numbers of~~ the width of the lubricant layer increases, about from 1.45 nm to 1.75 nm.

Please amend the paragraph beginning on page 15, line 22 as follows:

B30 Accordingly, according to the present invention, it is possible to manufacture the magnetic recording medium having a ~~desiring~~ desired width of the lubrication layer comprised of only the bonding sub-layer substantially by selecting ~~of~~ the number of times for repeating the one set process of the application process of applying the lubricant (I), the ultraviolet rays (UV) treatment process (II), and the washing process (III).

Please amend the paragraph beginning on page 15, line 31 as follows:

B31 A s~~S~~imilar effect as the above ~~mentioned one~~ can be taken in the case ~~of~~ ~~that~~where the liquid lubricant 4 ~~which~~ that is a perfluoro-polyether with an end-group including hydroxyl group is used in the first embodiment of the present invention. In this case, the lubricant 4 may be a compound such as FOMBLIN Zdo14000 available from Ausimont corp. The liquid lubricant 4 is prepared by diluting the FOMBLIN Zdo14000 to roughly 0.05 wt % in fluorocarbon solvent such as FLORINATE FC-77 of Sumitomo 3M corp.

Please amend the paragraph beginning on page 16, line 4 as follows:

B32 Next, a second embodiment of the present invention will be explained based on Figs. 4 and 5. ~~It is t~~The second embodiment of the present invention ~~to~~ repeats plural times

one set process of an application process of applying a lubricant, a heat treatment process, and a washing process to a protection layer of amorphous carbon on a magnetic recording medium. As contrasted with the first embodiment in which the ultraviolet rays (UV) treatment process is implemented, the heat treatment process is implemented in the second embodiment.

B32

Please amend the paragraph beginning on page 16, line 15 as follows:

B33

Fig. 4 is a diagram showing a step of the application process of applying a lubricant, a heat treatment process, and a washing process to the magnetic recording medium. The s~~S~~ame ~~marks~~ reference characters are ~~put on~~applied to like parts corresponding to ~~one~~ the process in Fig. 2 showing the first embodiment.

Please amend the paragraph beginning on page 16, line 21 as follows:

B34

In the second embodiment of the present invention, a magnetic recording medium 1 manufactured by the prior art is prepared in advance as ~~well as~~ in the first embodiment. The magnetic recording medium 1 has ~~the~~ a multilayered structure including a substrate, ~~the~~ an underlayer formed on the substrate, and ~~the~~ a magnetic layer formed on the underlayer. The protection layer of amorphous carbon is provided on the magnetic layer.

Please amend the paragraph beginning on page 16, line 30 as follows:

B35

In the second embodiment of the present invention, at first the magnetic recording medium 1 is immersed in a bath of a liquid lubricant 41 filled in a container ~~40~~45 and an application process (I) is implemented by a dip method for example.

Please amend the paragraph beginning on page 17, line 6 as follows:

B36

The application process (I) by the dip method is implemented for 30 seconds as a dipped time, and by pulling the magnetic recording medium 1 from the bath at 2.3 mm per second, for instance. The useful dipping method may not be limited, as known methods such as spin-coating method and wiping method are available too.

Please amend the paragraph beginning on page 17, line 30 as follows:

B37

A wash treatment (III) is implemented by immersing the magnetic recording medium 1 in a bath of a solvent 6 for washing filled in a container 60. The conditions for the wash treatment in the present embodiment are the same as ~~one~~ in the first embodiment. It is possible to manufacture the magnetic recording medium 1 formed on its surface by the lubrication layer 2 comprised of only the bonding sub-layer 21 substantially according to the present embodiment.

Please amend the paragraph beginning on page 18, line 22 as follows:

B38

Fig. 5 is a view showing a state that the bonding sub-layer is increasing by repeating one set process of an application process of applying a lubricant (I), the heat

treatment process (II), and a washing process (III) plural times. Fig. 5 shows widths of lubricant layer (widths of the bonding sub-layer substantially) measured after the surface of the magnetic recording medium is washed by the solvent for washing, as ~~well as~~in Fig. 3 ~~does~~.

B38

Please amend the paragraph beginning on page 18, line 31 as follows:

In Fig. 5, a white circle shows a case in which the application process and the heat treatment process are implemented one time according to prior art~~s~~. The width of lubricant layer in this case is about 0.85 nm.

B39

Please amend the paragraph beginning on page 18, line 36 as follows:

The respective black circles show widths formed by a process of the present invention. That is, they show respective cases of ~~that~~ the one set process of the application process of applying the lubricant (I), the ultraviolet rays (UV) treatment process (II), and the washing process (III) ~~is~~ being repeated 2 or 3 times. The respective black circles clearly show that the more the number of times repeating the one set process increases, the more ~~numbers of~~ the width of the lubricant layer increases, about from 1.05 nm to 1.15 nm. That is, the more the number of repetitions the one set process increases, the more ~~numbers of~~ the width of the lubricant layer increases.

B40

Please amend the paragraph beginning on page 19, line 25 as follows:

In the case of ~~to repeat~~repeating plural times one set process of an application process of applying a lubricant and an ultraviolet rays (UV) treatment process, the wash treatment process (III) as in the first embodiment of the present invention is not implemented and the magnetic recording medium 1 is manufactured with the same conditions as ones in the first embodiment. Therefore, an explanation based on a figure ~~of the~~showing process steps is omitted.

Please amend the paragraph beginning on page 19, line 34 as follows:

In the case of ~~to repeat~~repeating plural times one set process of an application process of applying a lubricant and a heat treatment process, the wash treatment process (III) as in the second embodiment of the present invention is not implemented and the magnetic recording medium 1 is manufactured with the same conditions as ones in the second embodiment. Therefore, an explanation based on a figure ~~about~~ showing process steps is omitted.

Please amend the paragraph beginning on page 21, line 4 as follows:

In Fig.6A a white circle shows a case in which the application process and the ultraviolet rays (UV) treatment process are implemented one time according to the prior arts. The width of the lubricant layer in this case is about 1.3 nm.

Please amend the paragraph beginning on page 21, line 9 as follows:

The respective black circles show widths according to the present invention. That is, they show respective cases of ~~that~~ the one set process of the application process of applying the lubricant (I) and the ultraviolet rays (UV) treatment process (II) ~~is~~ being repeated 2 or 3 times. The respective black circles clearly show that the more the number of times repeating the one set process increases, the more ~~numbers of~~ the width of the lubricant layer increases, about from 1.85 nm to 1.95 nm.

Please amend the paragraph beginning on page 21, line 19 as follows:

In Fig.6B a white circle shows a case in which the application process and an ultraviolet rays (UV) treatment process are implemented one time according to the prior art~~s~~. The width of the lubricant layer in this case is about 0.95 nm.

Please amend the paragraph beginning on page 21, line 24 as follows:

The respective black circles show widths according to the present invention. That is, they show respective cases of ~~that~~ the one set process of the application process of applying the lubricant (I) and the ultraviolet rays (UV) treatment process (II) ~~is~~ being repeated 2 or 3 times. The respective black circles clearly show that the more the number of times repeating the one set process increases, the more ~~numbers of~~ the width of the lubricant layer increases, about from 1.3 nm to 1.35 nm.

Please amend the paragraph beginning on page 21, line 34 as follows:

B47

In Fig.6C a white circle shows a case in which the application process and the heat treatment process are implemented one time ~~and the heat treatment process~~ according to the prior art~~s~~. The width of the lubricant layer in this case is about 0.95 nm.

Please amend the paragraph beginning on page 22, line 2 as follows:

B48

The respective black circles show widths according to the present invention. That is, they show respective cases of ~~that~~ the one set process of the application process of applying the lubricant (I) and the heat treatment process (II) ~~is~~ being repeated 2 or 3 times. The respective black circles clearly show that the more the number of times repeating the one set process increases, the more ~~numbers of~~ the width of the lubricant layer increases, about from 1.1 nm to 1.2 nm.

Please amend the paragraph beginning on page 23, line 9 as follows:

B49

It is possible to manufacture the magnetic recording medium forming the lubrication layer substantially comprised of at least 1nm or more widths of the bonding sub-layer on the protection layer of amorphous carbon, according to the present invention. ~~Besides~~Furthermore, it is possible to make a desired width by properly selecting the number of times ~~of~~ the treatment process is repeated.

Please amend the paragraph beginning on page 23, line 17 as follows:

B50

Therefore, as compared with the lubricant layer of the magnetic recording medium in the prior arts, the lubrication layer can be maintained under a state of a low coefficient of friction for a long period of time, because the width of the magnetic recording medium according to the present invention is thick and the reduction of the width of the lubrication layer is very little with time progress.